ORIGINAL
FILE

ADVANCED TELEVISION RESEARCH PROGRAM

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ROOM E15-387, CAMBRIDGE, MASSACHUSETTS 02139

87-268 1

November 18, 1987

RECEIVED BY
NOV 20 1987
MAIL BRANCH

Secretary of the Commission
Rm 222
Federal Communications Commission
1919 M St. NW
Washington DC 20554

Dear sir:

In the material that I submitted on Nov. 17, in connection with the Inquiry on Advanced Television Systems, there was an error on page 4.2-1. I would appreciate it if you would put the enclosed corrected pages into the 14 copies that I provided. The 3-hole punched page is for the "Reproducible Copy" provided in a loose-leaf binder. In that case, the corrected page should be substituted for the existing page.

Thank you very much.

Very truly yours,

William F. Schreiber

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87-268

November 13, 1987 ATRP-T-77

Performance of Proposed EDTV and HDTV Systems

Executive Summary

In this note, the performance of the principal schemes that have been proposed for Advanced Television Systems is analyzed. The results of the analysis are tabulated and displayed graphically, with additional comments. Performance parameters included are spatial resolution in fixed and moving areas for both luminance and chrominance, bandwidth requirements, degree of compatibility, probable performance under multipath and low SNR conditions, and receiver complexity. In some cases specific advantages and disadvantages are pointed out.

Basic Assumptions

In the following analysis, we have assumed that the resolution is limited primarily by the scanning standards and the channel bandwidth, and in some cases by the amplifier bandwidth. Camera resolution is not taken into account. The actual resolution achieved will be less than shown, with the reduction being larger for the higher-resolution systems. The vertical resolution in lines/picture height (lph) is set equal to the number of active lines for systems that use double the number of lines, progressively scanned, in the display as compared with the channel signal. Where the display is at the same standards as the channel, the resolution is assumed to be .7 times this figure, and if the display is progressively scanned with the same number of lines or interlaced with twice the number of lines, the ratio is taken to be .85. The horizontal resolution in pels/picture width (ppw) is taken to be twice the bandwidth times the active line time. All frequency-plane figures are to the same scale.

There is some uncertainty in the calculations, because none of the systems is decribed precisely and completely in the literature. In the case of systems that use diagonal sampling, there is also some uncertainty in the combined effect of the diagonal filtering, subsampling, and subsequent transmission through a low-pass filter whose bandwidth is less than the Nyquist bandwidth for the given sampling rate. No large errors are believed to exist in the charts, however.

Iredale (Del Rey) System (not shown)

This system claims an area resolution of three times that of NTSC. Starting with a signal of this high resolution, subsampling produces a signal (with aliasing) that has NTSC scanning standards and can be viewed on a standard receiver. The special receiver uses a frame store to reconstruct the high resolution picture. As described in the paper, the EDTV receiver is exactly like MUSE, but without even the minimal motion adaptation of the latter. The compatible signal shows the aliasing as 10 Hz flicker around sharp edges. The flicker can be reduced by a certain amount of prefiltering, which would reduce the SNR of the EDTV image. Moving objects would expect to be blurred by the subsampling, as in MUSE, but probably to a larger degree because of the lack of motion-adaptive interpolation.

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